PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		)	
		)	
Douglas E. Weiss		)	Examiner: Tsoy
		)	
Serial No.:	09/853,217	)	Group Art Unit: 1762
		)	
Filed:	May 11, 2001	)	Docket: 55944US002
		)	(102.0035US01)
For:	Pulsed Electron Beam Polymerization	)	

APPELLANTS' REPLY BRIEF ON APPEAL

APPELLANTS' REPLY BRIEF ON APPEAL
TABLE OF CONTENTS

I. STATUS OF THE CLAIMS

Claims 1-15 and 18-22 are pending in the application. Claims 18-22 have been withdrawn. Claims 1-15 have been rejected. Rejection of claims 1-15 is appealed. A complete listing of the pending claims is provided in the Claims Appendix at the end of Applicant's Appeal brief.

II. GROUNDS OF REJECTION TO BE REVIEWED UPON APPEAL

Whether claims 1-15 are obvious under 35 U.S.C. 103(a) over Weiss et al (WO 00/04055) in view of Loda (U.S. 4,163,172), Mukohyama et al (U.S. 4,886,840) and Botman et al (Nuclear Instruments and Methods in Physics Research B 139).

III. ARGUMENT

(a) The Examiner asserts, at page 4, that Weiss et al. teaches the general conditions of the claimed invention, including the use of decreased flux of electrons, the use of low temperature, and the use of high dose rates. The Examiner then asserts, at page 4, lines 9-10, with regard to use of a pulsed e-beam, that "Weiss et al. teach that *a number of different methods* can be employed to provide the desired dose and residence time". The Examiner further asserts that Weiss et al does not limit the teaching to a particular e-beam to carry out the invention, and that it would be obvious to use any sort of e-beam radiation on the basis of Weiss.

Applicants respectfully disagree. Even if one assumes, for the sake of appeal, that Weiss teaches continuous e-beam radiation, without specifically limiting to continuous e-beam radiation, Applicants disagree that it would then be obvious to use pulsed e-beam radiation interchangeably with continuous e-beam radiation. One of skill in the art, having Weiss et al. before them, would perceive no reason to use a pulsed e-beam as claimed in the present invention.

The Examiner argues that this situation is one of optimization of Weiss et al. (see page 4, line 23 to page 5, line 2). Applicants respectfully disagree, because the present case is not one of optimizing a known method. This is a situation where the claimed method disregards known methods to implement an invention that recognizes a novel and non-obvious relationship between pulse rate and dosage for polymerization of coatings. Optimization of Weiss et al. would involve changing the duration or intensity of the e-beam. In contrast, Applicants have discovered that the manner in which the electron beam dose is delivered by use of pulsed e-beam can have dramatic and unexpected effects on the polymerization process itself. Thus, not just the dosage is important, but how that dose is delivered is critical. Specifically, when the dose per pulse is relatively low (e.g. about 10 to 90 Gy) and the pulse rate is below 500 Hz, the

polymerization reaction takes place primarily in the homogenous mode because of the longer time intervals between pulses (diffusion). As the frequency of the pulses is increased above about 500 Hz, the heterogeneous mode of polymerization becomes more dominant, because the shorter interval between pulses increasingly favors heterogeneous kinetics (see pp. 13-14 of the specification). This surprising and unexpected discovery is not appreciated or otherwise made obvious anywhere in the art of record. Thus, the presently claimed use of a pulsed beam is a non-obvious and distinct method in view of Weiss et al. that is clearly outside the scope of "optimization"

(b) The Examiner asserts, at page 5, lines 21 to 24, that "the cited prior art shows that *pulsed* electron beams having decreased doses per pulses, e.g. within a range e.g. 0.92-75 Gy per pulse and *pulsed* electron beam having either long or very short pulses, of the order of microseconds (high frequency of at least 500 pulses per second) are known to be used for polymerization of an electron curable composition."

Applicants respectfully disagree. This argument again fails to appreciate that the non-obvious combination of the cited references fails to teach that when the dose per pulse is relatively low (e.g. about 10 to 90 Gy) and the pulse rate is below 500 Hz, the reaction takes place primarily in the homogenous mode because of the longer time intervals between pulses (diffusion). As the frequency of the pulses is increased above about 500 Hz, the heterogeneous mode of polymerization becomes more dominant, because the shorter interval between pulses increasingly favors heterogeneous kinetics (see pp. 13-14 of the specification).

(c) The Examiner asserts, at page 9, line 25 to page 10, line 2, that Applicant has not adequately traversed, in the remarks submitted on 9/13/2005, the Examiner's statement that Loda's e-beam is capable of providing at least 500 pulses per second.

Applicants respectfully disagree. The Applicants unequivocally challenged the Examiner's use of Loda, asserting specifically that "none of the cited references teach or suggest that heterogeneous polymerization of a single-phase system can be achieved by irradiating the composition with a frequency of pulses above 500 Hz." Thus Applicants specifically, and unequivocally asserted that the teaching of 500 Hz e-beam radiation was outside the scope of the claimed invention. The fact that the Applicants identified numerous other distinguishing aspects of Loda (in the quoted remarks and other remarks of record) does not negate the fact that Applicants raised the issue that Loda and the other references failed to teach the claimed limitations, including the limitation of 500 Hz e-beam radiation. Indeed, in view of the strong objections raised by Applicants to Loda in the remarks of 9/13/2005, Applicants respectfully assert it would be manifestly unreasonable to interpret any aspect of the remarks as accepting the Examiner's interpretation of Loda.

For the reasons stated in Applicants Appeal Brief, and this Reply Brief, Applicants respectfully request a finding that the present claims are non-obvious and warrant allowance.

Respectfully submitted,

DOUGLAS E. WEISS

By his Representatives,

Date: December 1, 2007

By // Daniel M. Pauly //
Daniel M. Pauly
Reg. No. 40,123
Customer Number: 57557